

US-PAT-NO: 6326326

DOCUMENT-IDENTIFIER: US 6326326 B1

TITLE: Surface functionalized mesoporous
material and method of
making same

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Brief Summary Text - BSTX (40):

It is expected that the economic and performance advantages of SFMM for mercury are also achieved for metals that have similar binding characteristics with the functionalized surface. Examples include but are not limited to Cu, Cd, Ag, Pb, and Eu. It is further expected that the advantages noted for mercury would be applicable to other metals (e.g. Cr, Ni, Co) using different functional groups including but not limited to polycarboxylic acids, for example EDTA, ethylenediamine, bipyridyl, phenanthroline, phenols, polyhydroxyaromatic, carbonyl compounds, phosphine, phosphine oxide, isonitrile and combinations thereof. Other target materials include arsenic, bismuth, plutonium, ruthenium, and combinations thereof.

Detailed Description Text - DETX (55):

An amount of mesoporous silica (1.29 g) (mesoporous material) was mixed with 2.0 mL of functional molecule tris(methoxy)mercaptopropylsilane (TMMPS) in 100 mL chloroform. The mixture was stirred at room temperature for over 5 days and then filtered. Only about 10% of the mesoporous silica surface was covered with a monolayer.

Detailed Description Text - DETX (59):

An experiment was conducted to demonstrate mercury removal using SFMM. The SFMM was made from a silica powder having a pore size of about 65 Angstroms mixed with mercaptopropylsilane layer in powder form with a 10-25% surface coverage of the mercaptopropylsilane. For the 10% surface coverage, the mesoporous silica (1.29 g) was mixed with 2.0 mL TMMPS in 100 mL chloroform. The mixture was stirred for over 5 days at room temperature then filtered, washed copiously with chloroform and dried under vacuum.

Detailed Description Text - DETX (131):

Phosphine ligands as functional molecules were installed and used to make complexes with transition metals. The phosphine complexes have possible applications in catalysis.

Claims Text - CLTX (13):

11. The surface functionalized mesoporous material as recited in claim 1, wherein said functional group is selected from the group consisting of phosphine, thiol, thioalkoxide, and combinations thereof.